

Draft - February 2, 1994

Hood Canal Geographic Response Plan Workshop Data Recording Sheet

Resource: Pacific Salmon: chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), sockeye (*O. nerka*), chum (*O. keta*), pink (*O. gorbuscha*), and steelhead (*O. mykiss*).

Resource Information Mapped: Major anadromous streams and salmon culture facilities. This map does not include numerous smaller and very productive streams.

Resource Use: Human; extensive commercial and recreational fisheries. Non-human; the list of predators on the various life history stages of salmon is extensive and includes several species of birds (bald eagle), fish, marine mammals, and terrestrial mammals.

General Location or Habitat Association of Resource: Salmon spawn and rear in all major Washington watersheds and in many of the smaller tributaries. Numerous salmon culture facilities are located throughout the Puget Sound basin. Salmon are anadromous in that they begin life in fresh water, spend the largest portion of their life in salt water, then return to fresh water to spawn. There is a broad range of life history types both between and within the species. Both juvenile and adult salmon are present year-round throughout this region.

Seasonal Sensitivity: Varies with species, stock, and river system. See habitat association and timing table.

Stock Sensitivity: Attached is a list of the Hood Canal stocks, their parent streams, stock type and status. In summary, for each of the species present in the region the following number of stocks are listed as depressed or critical. Chum - 1 critical; Coho - 5 depressed; Pink - 1 depressed; Steelhead - 5 depressed.

Recommended Protection Strategy: In the estuaries contain and recover oil in the main channels as close to the entrances as possible or divert to shore based recovery points. Keep oil off of the intertidal flats. Where oil cannot be excluded from the beach use clean up techniques which do not force oil into beach substratum or transport it into the lower intertidal or subtidal zones. Boom the river and stream mouths where extensive tidal influence is present.

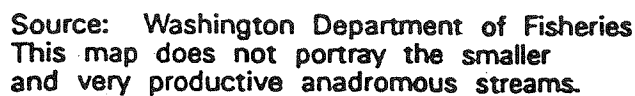
Information Recorder: WDF - Oil Spill Response and Damage Prevention Unit

References:

Emmett, R.L., S.L. Stone, S.A. Hinton, and M.E. Monaco. 1991. Distribution and abundance of fishes and invertebrates in west coast estuaries; Volume II: species life history summaries. ELMR Rep. No. 8. NOAA/NOS Strategic Environmental Assessments Division, Rockville, MD, 329 p.

Washington Department of Fisheries. 1992. Salmon, marine fish and shellfish resources and associated fisheries in Washington's coastal and inland marine waters. Wa. Dept. Fish. Tech. Rpt. 79. 70 p.

Washington Department of Fisheries, Washington Department of Wildlife, and Western Washington Treaty Indian Tribes. 1993. 1992 Washington State salmon and steelhead stock inventory (SASSI). Olympia, Washington. 212 pp.



**Hood Canal Geographic Response Plan Workshop
Data Recording Sheet**

Resource: Pacific Herring (*Clupea harengus pallasii*)

Resource Information Mapped: Adult prespawning holding areas and spawning areas.

Resource Use: Human; sport bait fishery targets juvenile fish. Non-human; one of the most important components of the marine food chain; they provide the link between primary production and upper level predators. All life history stages utilized as food by various predators including salmon, rockfish, lingcod, halibut, birds, marine mammals, etc.

General Location or Habitat Association: The adult prespawning holding areas are located in the northern end of Hood Canal near Port Gamble and the southern end near Union. Herring spawning occurs in Squamish Harbor, Salsbury Pt., Quilcene Bay, Whitney Pt., Pleasant Harbor, Quatsap Pt., Seabeck Bay, Stavis Bay, and the southern end of the canal near Lynch Cove. Herring deposit their eggs on marine vegetation, such as eel grass or algae, within the shallow subtidal and intertidal zones.

Seasonal Sensitivity or Occurrence: Adult herring congregate in relatively distinct areas during December through June prior to spawning. Exposure of pre-spawning adults to oil can result in the accumulation of hydrocarbon compounds in the yolk of maturing eggs. Metabolism of these compounds during embryonic and larval stages can result in lethal and sublethal genetic, cellular and morphological injuries. Spawning occurs from mid-January through mid-April. Eggs hatch after approximately 10 days. Larvae and subsequent juvenile fish are found in nearshore areas throughout the following summer. Eggs and larvae are highly susceptible to injury (lethal) from oil exposure.

Recommended Protection Strategy: Utilize open water and nearshore containment and collection techniques to keep oil off of the spawning substrate throughout the region. Use exclusion boom where feasible (Pleasant Harbor).

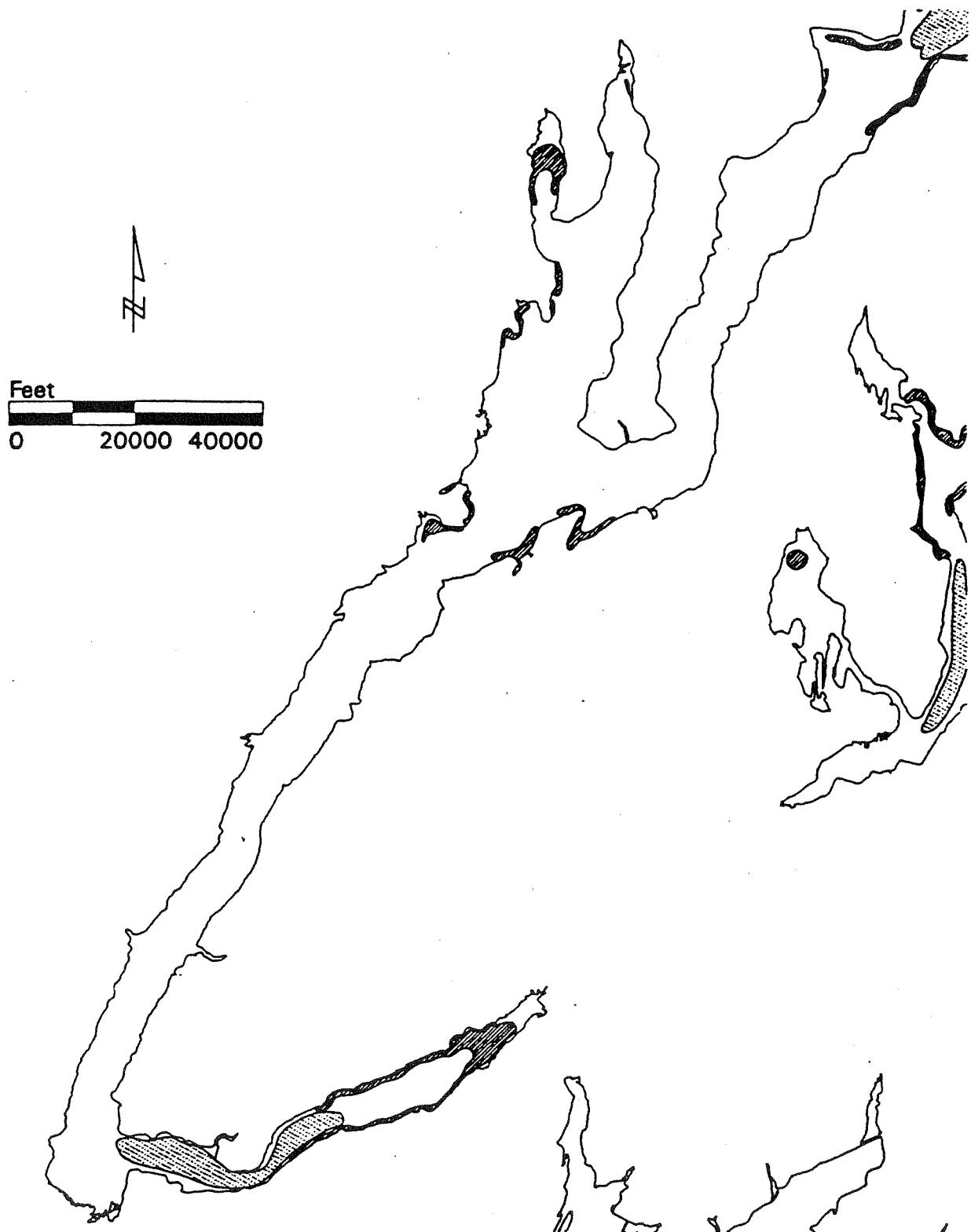
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Hood Canal Baitfish Resources



Herring Spawning
 Herring Holding
 USGS Shoreline

Source: Washington Department of Fisheries
 This map does not offer complete information on
 fish and shellfish resource distribution. Comprehensive
 surveys have not been conducted along all shorelines.

Draft - January 28, 1994

Hood Canal Geographic Response Plan Workshop Data Recording Sheet

Resource: Surf Smelt (*Hypomesus pretiosus*)

Resource Information Mapped: Intertidal surf smelt spawning areas.

Resource Use: Human - commercial and recreational harvest. Non-human - important component of the marine food chain; smelt provide the link between primary production and upper level predators. All life history stages are utilized as food by various predators including salmon, rockfish, lingcod, halibut, birds, marine mammals, etc.

General Location of Sensitive Resource: Surf smelt deposit their eggs in the uppermost intertidal zone on gravel generally having a grain size from 1 to 7 mm. Incubation takes 2 - 4 weeks. Larvae are found in adjacent nearshore surface waters for several weeks following hatching. Spawning areas exist along nearly all the shoreline east of the Great Bend, the entire southeast shoreline of Quilcene Bay (not mapped) and scattered sites around northern Dabob Bay (not mapped). Other undocumented spawning areas are suspected in the region.

Seasonal Sensitivity or Occurrence: Surf smelt spawning occurs in this region from mid-September through February. Eggs and larvae are highly susceptible to injury (lethal) from oil exposure.

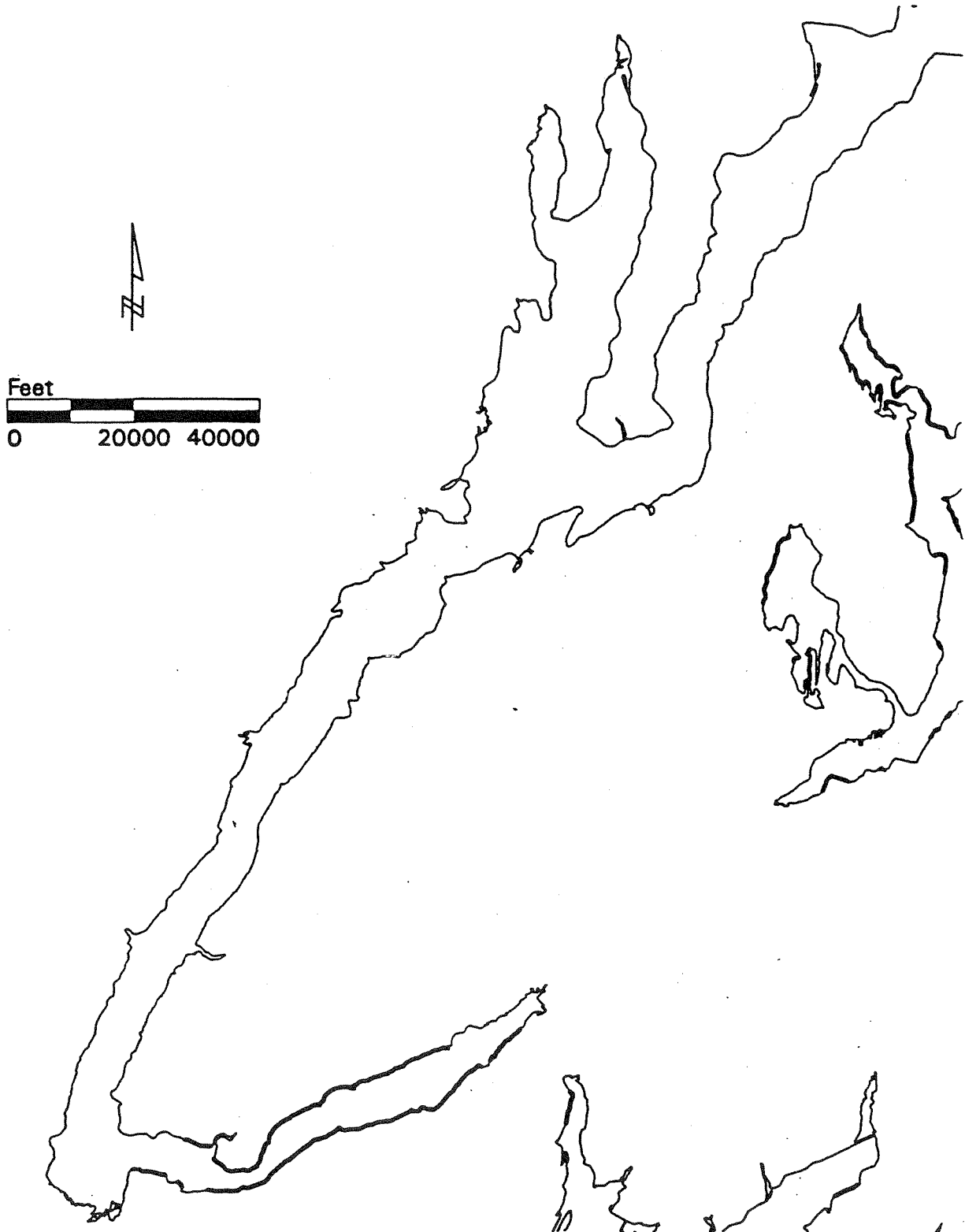
Recommended Protection Strategy: Keep oil off of spawning beaches regardless of season. Utilize aggressive open water and nearshore containment and collection techniques to keep oil off of the spawning substrate. Use protection or exclusion boom where feasible.

Information Recorder: WDF - Oil Spill Response and Damage Prevention Unit

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Hood Canal Baitfish Resources



Smelt Spawning

USGS Shoreline

Source: Washington Department of Fisheries
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 fish and shellfish resource distribution. Comprehensive
 surveys have not been conducted along all shorelines.

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Hood Canal Geographic Response Plan Workshop Data Recording Sheet

Resource: Pacific Sand Lance (*Ammodytes hexapterus*)

Resource Information Mapped: Documented intertidal spawning areas and larval rearing areas.

Resource Use: Human - sand lance are used as bait by recreation fishers. Non-human - important component of the marine food chain; sand lance provide the link between primary production and upper level predators. All life history stages are utilized as food by various predators including salmon, rockfish, lingcod, halibut, birds, marine mammals, etc.

General Location or Habitat Association of Resource: Pacific sand lance spawn from November through February and deposit their eggs on upper intertidal sandy-gravel beaches. Documented spawning areas shown on the map include Union and Musqueti Pt. Those not shown include scattered sites in Quilcene Bay and northern Dabob Bay, Pleasant Harbor, and Scenic Beach State Park. Sand lance larvae are widespread in the regions near-surface waters from January through March. It is suspected that additional spawning and larval habitat exists within the region. Adult sand lance are found in nearshore habitats throughout the region.

Seasonal Sensitivity: The highest sensitivity is during the spawning and larval stages from October through March. Eggs and larvae are highly susceptible to injury (lethal) from oil exposure.

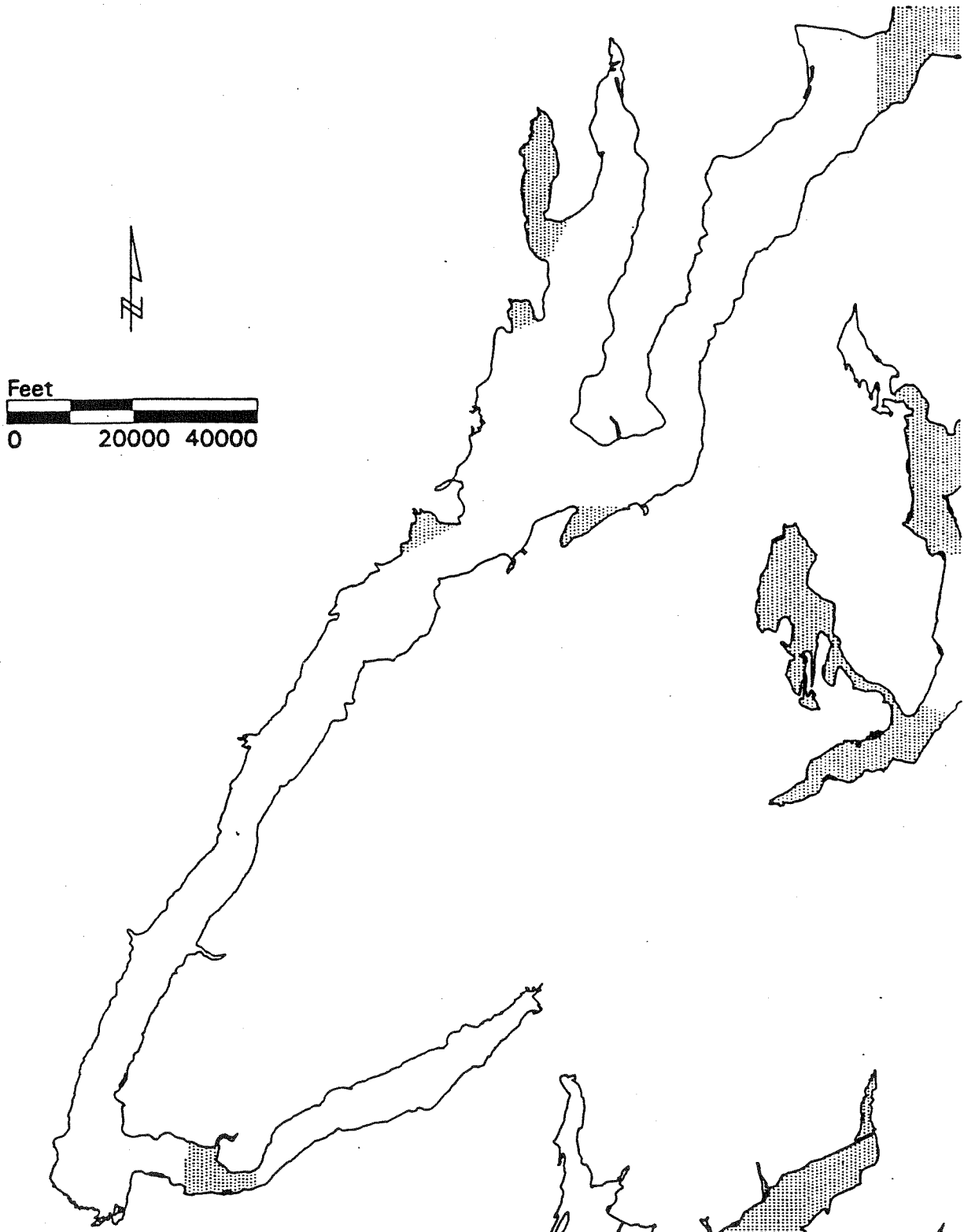
Recommended Protection Strategy: Keep oil off of spawning beaches regardless of season. Utilize aggressive open water and nearshore containment and collection techniques to keep oil off of the spawning substrate. Use protection or exclusion boom where feasible (Pleasant Harbor).

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Hood Canal Baitfish Resources



Sand Lance Spawning

Sand Lance Larvae

USGS Shoreline

Source: Washington Department of Fisheries
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 fish and shellfish resource distribution. Comprehensive
 surveys have not been conducted along all shorelines.

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**Hood Canal Geographic Response Plan Workshop
Data Recording Sheet**

Resource: Cancer Crab

Resource Information Mapped: Dungeness (*Cancer magister*) and red rock (*C. productus*) crab distribution. Map depicts primarily adults but does cover some juvenile areas.

Resource Use: Human - large commercial and recreational harvest. Non-human - all life history phases are utilized as food by numerous fish species (eg. Pacific herring, lingcod, rockfish, coho and chinook salmon, halibut, English sole and cabezon), octopus, sea otters, harbor seals, sea lions, and gulls.

General Location or Habitat Association of Resource: Cancer crab are found throughout Hood Canal. Priority areas include Quilcene Bay, the Dosewallips, Duckabush and Hamma Hamma River mouths, Lilliwaup, Annas Bay, Tahuya, and Seabeck Bay. Adults are found from the intertidal to -90 m MLLW and prefer sandy substrates. Juveniles are found intertidally and typically associated with eelgrass, ulva, bivalve shells, or some form of cover, from +3 to -15 m MLLW. Larvae and megalopae are planktonic. Megalopae are typically found in nearshore waters where they settle to the bottom and metamorphose into juveniles during summer. Females carry incubating eggs beginning in the fall and hatching occurs between February and April.

Seasonal Sensitivity: Larvae/megalopae - planktonic - March through July. Juveniles - epibenthic intertidal - year-round.

Recommended Protection Strategy: Protect nearshore juvenile habitat, particularly eelgrass beds. Utilize protective booming where possible and aggressive open water collection techniques elsewhere.

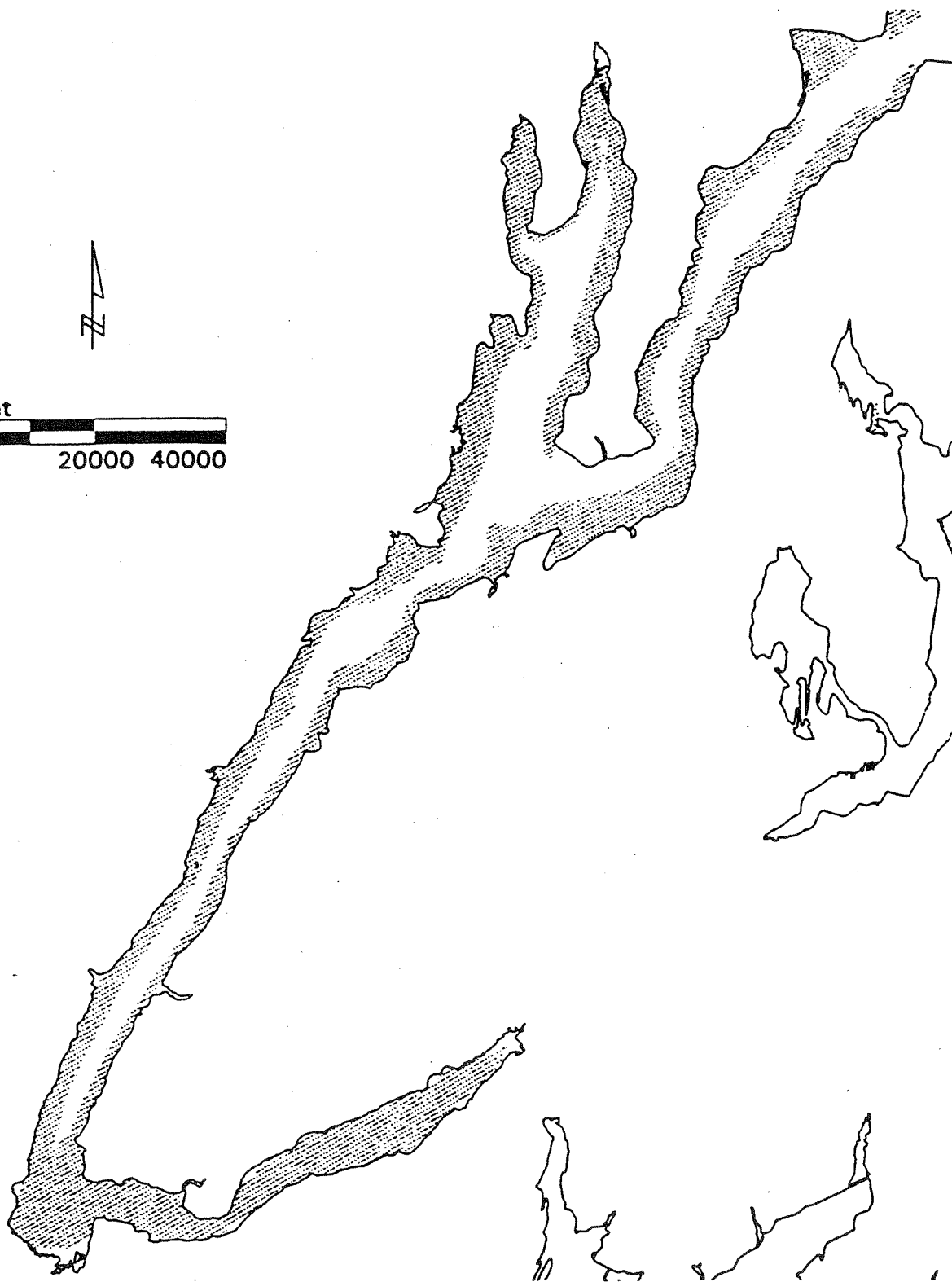
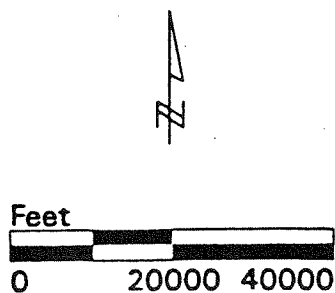
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Washington Department of Fisheries. 1992. Salmon, marine fish and shellfish resources and associated fisheries in Washington's coastal and inland marine waters. Wa. Dept. Fish. Tech. Rpt. 79. 70 p.

Hood Canal Shellfish Resources



Cancer Crab

USGS Shoreline


Source: Washington Department of Fisheries
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fish and shellfish resource distribution. Comprehensive
surveys have not been conducted along all shorelines.

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**Hood Canal Geographic Response Plan Workshop
Data Recording Sheet**

Resource: Pandalid Shrimp

Resource Information Mapped: Harvest areas for four species of shrimp including; pink (*Pandalus jordani* and *P. borealis*), coonstripe (*P. danae*), and spot prawn (*P. platyceros*).

Resource Use: Human - commercial and recreational fisheries. Hood Canal supports the largest recreation shrimp fisheries in the state. Non-human - food organism for many fish species including rockfish, cabezon, and perch.

General Location or Habitat Association of Resource: Most harvest occurs in waters 100 to 220 m deep, however, the coonstripe and spot prawn are found as shallow as the lower intertidal zone. Pandalid shrimp are found throughout Hood Canal.

Seasonal Sensitivity: Planktonic larval phase from February through July.

Recommended Protection Strategy: Utilize beach clean up techniques that do not transport oil into shallow subtidal area.

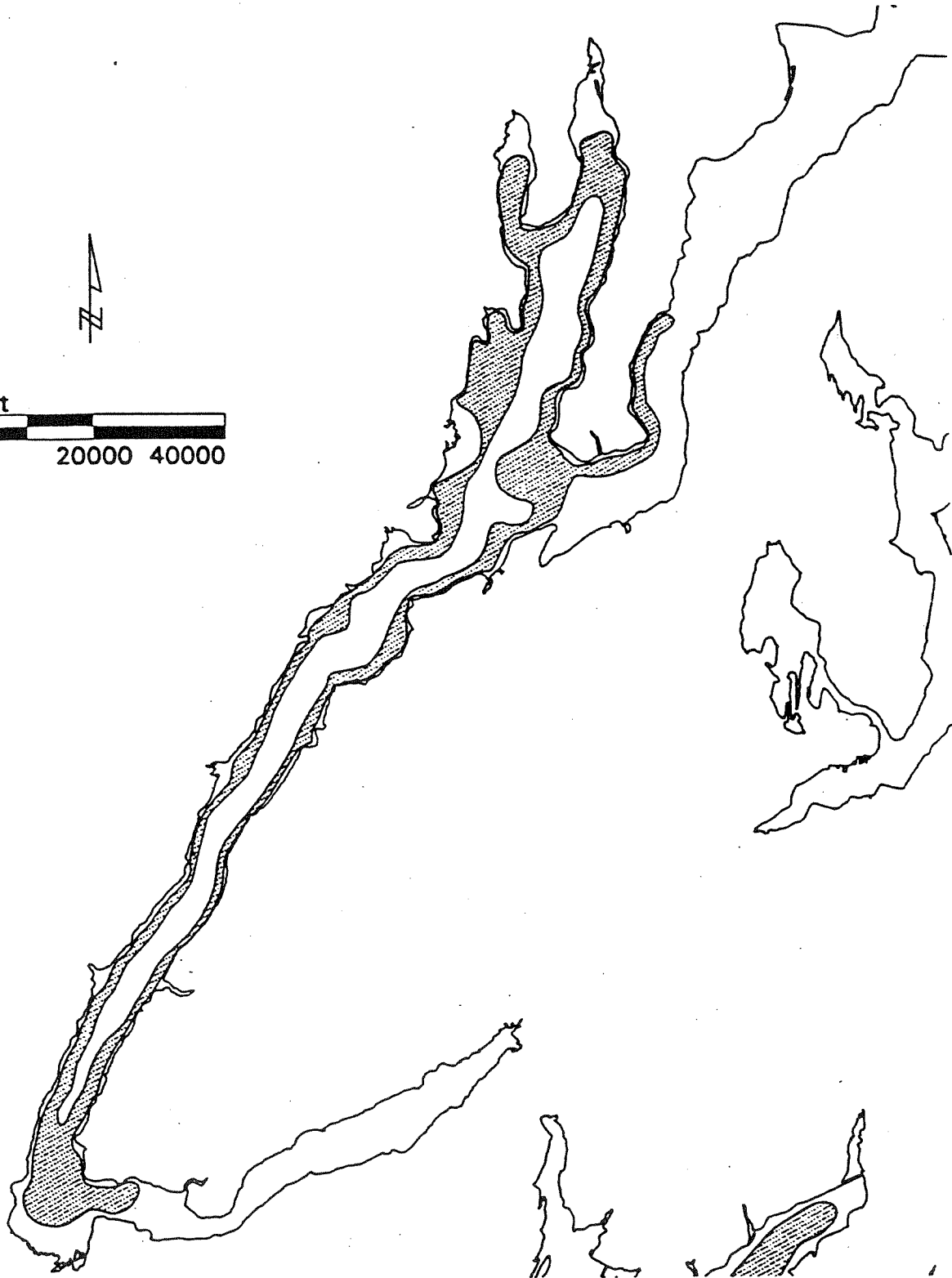
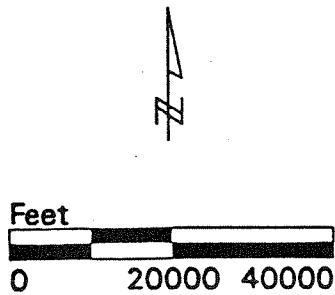
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References:

Washington Department of Fisheries. 1992. Salmon, marine fish and shellfish resources and associated fisheries in Washington's coastal and inland marine waters. Wa. Dept. Fish. Tech. Rpt. 79. 70 p.

Hueckel, G.J. 1980. Foraging on an artificial reef by three Puget Sound fish species. Wa. Dept. Fish. Tech. Rpt. 53. 110 p.

Hood Canal Shellfish Resources



Pandalid Shrimp



USGS Shoreline



Source: Washington Department of Fisheries
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**Hood Canal Geographic Response Plan Workshop
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Resource: Intertidal and subtidal hardshell clams and intertidal softshell clams.

Resource Information Mapped: Hardshell species include the native littleneck (*Protothaca staminea*), the Manila littleneck (*Tapes philippinarum*), butter clams (*Saxidomus giganteus*), piddock clams (*Zirfaea pilsbryi*), horse clams (*Tresus capax* and *T. nuttallii*), and cockles (*Clinocardium nuttalli*). The only softshell species is the eastern softshell clam (*Mya arenaria*).

Resource Use: Human; commercial and recreational harvest. Non human; as a group clams are feed upon by a wide variety of organisms including snails, sea stars, Dungeness and rock crabs, several species of commercially and recreationally import fish, sea otters, raccoons, scoters and other birds.

General Location or Habitat Association of Resource: Clams are found throughout the region with higher concentrations in Squamish Harbor, Dabob Bay, Quilcene Bay, Triton Cove, Eldon, Lilliwaup, Annas Bay, Twanoh, and Dewatto Bay north to Chinom Pt. Clams are found from approximately +2 m MLLW in the intertidal zone to subtidal depths of -21 m MLLW.

Seasonal Sensitivity: Due to their sessile lifestyle in the intertidal zone clams are at high risk of exposure throughout the year. Sensitivity would be elevated during the spawning and larval period which can extend from April through October.

Recommended Protection Strategy: Utilize protective and exclusion booming where possible and aggressive open water collection techniques elsewhere. Where oil cannot be excluded from the beach use clean up techniques which do not force oil into beach substratum.

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**Hood Canal Geographic Response Plan Workshop
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Resource: Pacific Oyster (*Crassostrea gigas*)

Resource Information Mapped: Oyster beds, primarily cultured.

Resource Use: Human - recreational and commercial harvest.
Non-human - Oyster beds provide important habitat for juvenile dungeness crab. Juvenile and adult oysters are preyed upon by dungeness and red rock crab, several starfish species, and surf and white-winged scoters.

General Location or Habitat Association of Resource: Pacific oysters are found in the lower intertidal and shallow subtidal zones along almost the entire shoreline of Hood Canal. Priority areas include Squamish Harbor, Dabob Bay, Quilcene Bay, Whitney Pt., Wawa Pt. to Duckabush, Triton Cove, Eldon, Lilliwaup, Annas Bay, Twanoh, Lynch Cove, Musquetti Pt., and Dewatto Bay north to Chinom Pt

Seasonal Sensitivity: Due to their sessile lifestyle in the intertidal zone oysters are at high risk of exposure throughout the year. Relative to their habitat function for juvenile dungeness crab the most sensitive period would be June through December.

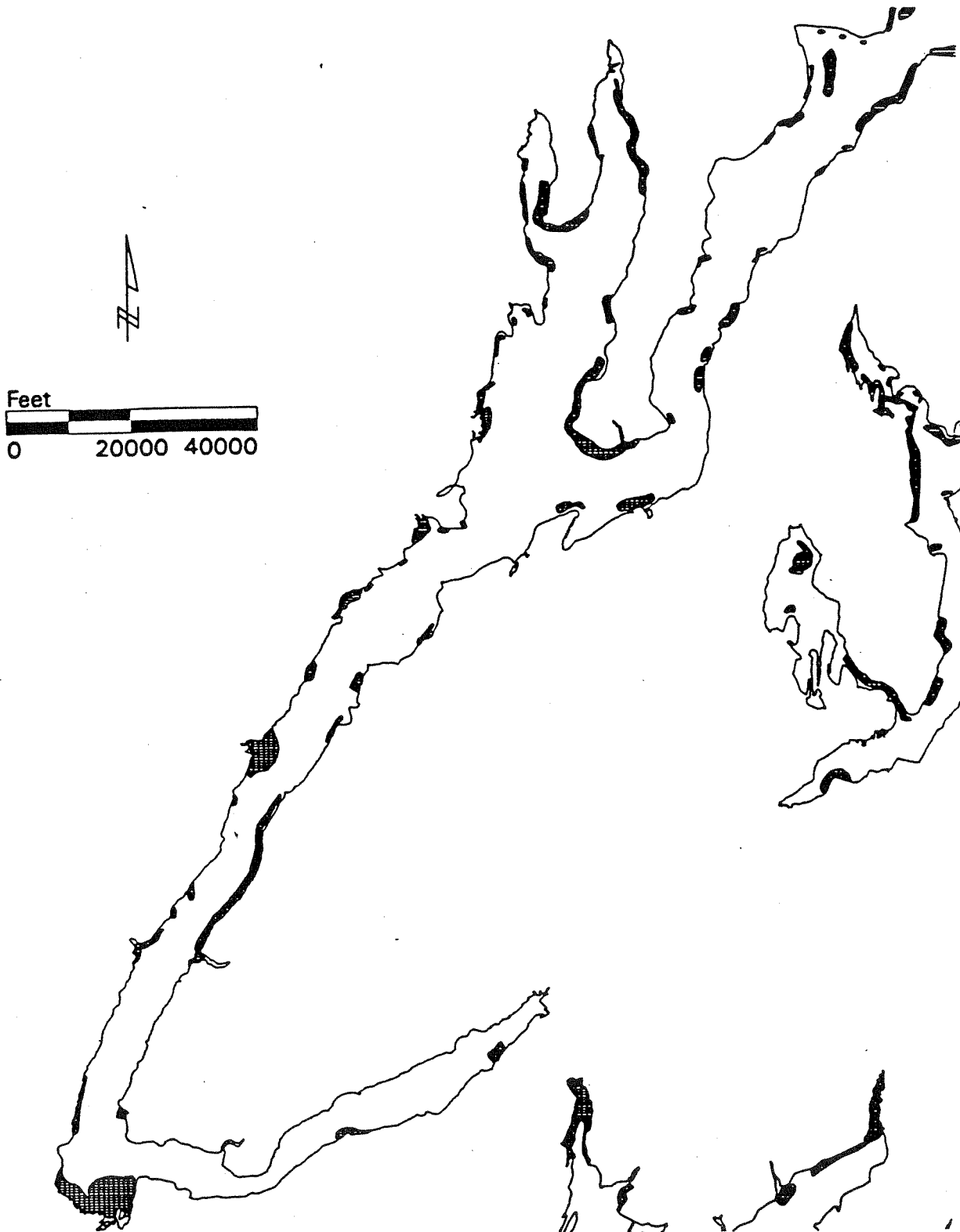
Recommended Protection Strategy: Utilize protective booming where possible and aggressive open water collection techniques elsewhere.

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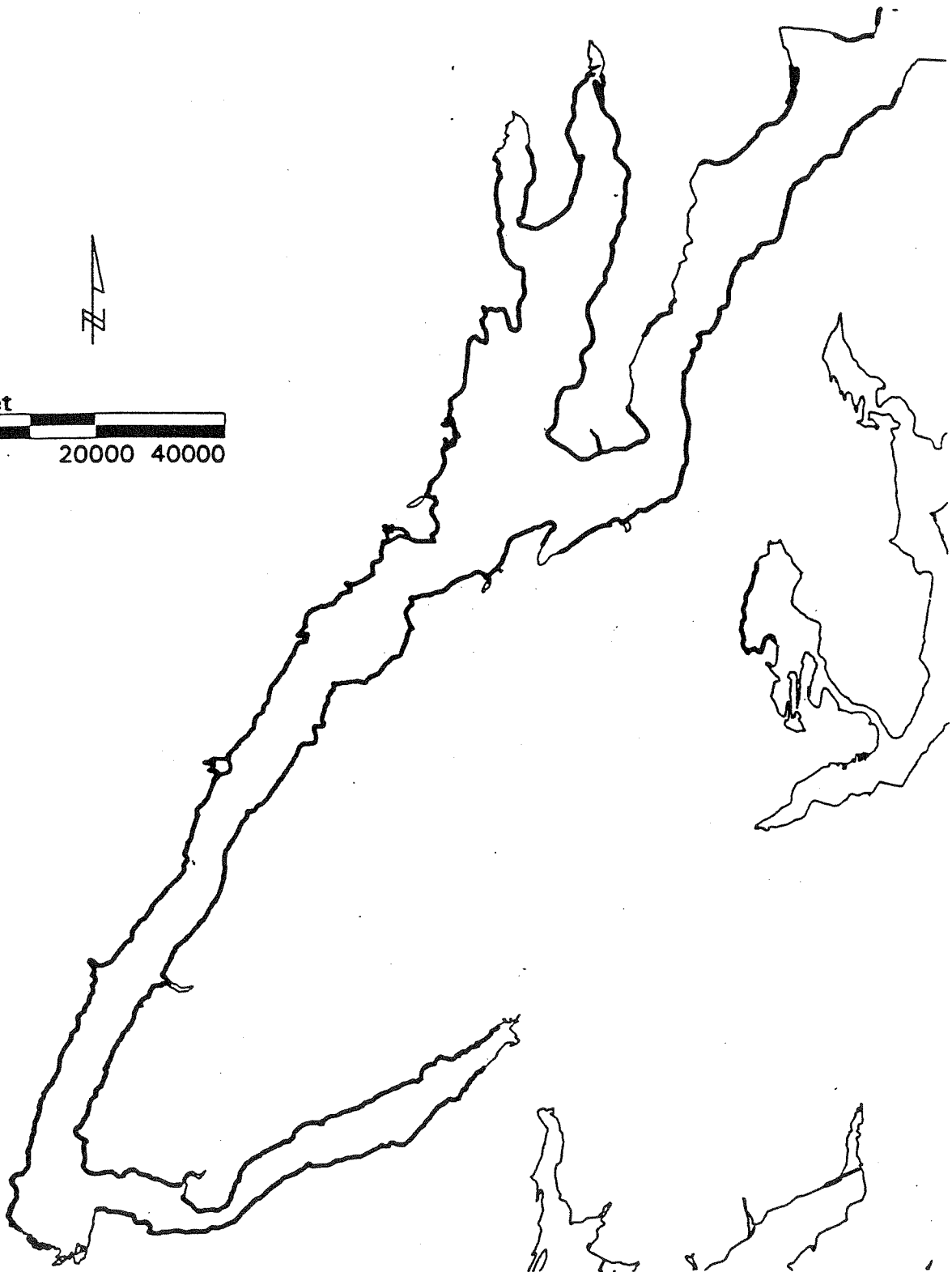
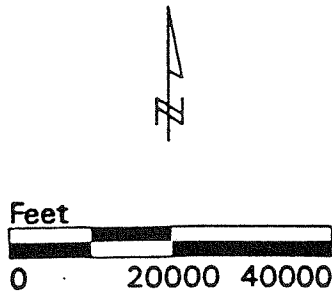
Hood Canal Shellfish Resources



Intertidal Hardshell Clam
 Subtidal Clam
 USGS Shoreline

Source: Washington Department of Fisheries
 This map does not offer complete information on
 fish and shellfish resource distribution. Comprehensive
 surveys have not been conducted along all shorelines.

Hood Canal Shellfish Resources



Oyster
USGS Shoreline

Source: Washington Department of Fisheries
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**Hood Canal Geographic Response Plan Workshop
Data Recording Sheet**

Resource: Geoduck Clams (*Panope abrupta*)

Resource Information Mapped: Geoduck clam distribution (commercial quantities).

Resource Use: Human; Geoducks support a large commercial and recreational fisheries. Non human; Geoducks are fed upon by snails, pandalid shrimp, rock crab, English sole, sand sole, rock sole, starry flounder, starfish, and sea otters.

General Location or Habitat Association of Resource: High concentrations of geoducks are found throughout the region. They inhabit depths from +1 to -110 m MLLW and prefer a stable mud and sand substrate.

Seasonal Sensitivity: Sensitivity would be highest during the spawning and larval period from April through August (peak May - July).

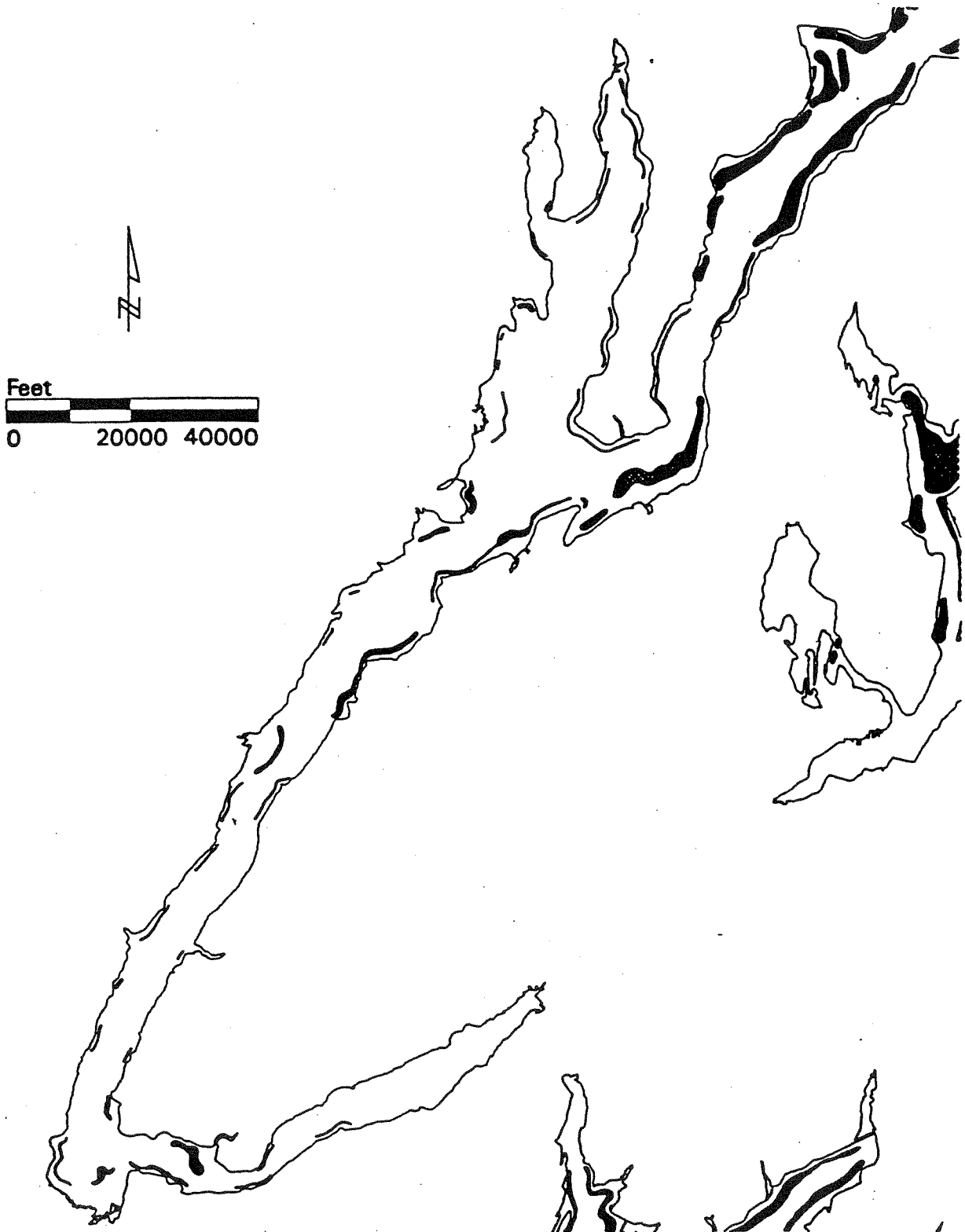
Recommended Protection Strategy: Utilize beach clean up techniques which do not transport oil into the subtidal zone.

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Hood Canal Shellfish Resources



Geoduck

USGS Shoreline

Source: Washington Department of Fisheries
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**Hood Canal Geographic Response Plan Workshop
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Resource: Scallops; rock scallop (*Crassadoma gigantea*), pink scallop (*Chlamys rubida*), and spiny scallop (*Chlamys hastata*).

Resource Information Mapped: Resource presence based on WDF dive surveys.

Resource Use: Human; rock scallop - recreational harvest; pink and spiny scallop - recreational and commercial harvest.

General Location or Habitat Association of Resource: Rock scallops are found from the shallow subtidal to -50 m attached to rocky substrates. Pink and spiny scallops are found from -1 m to -300 m depth. Pinks prefer sandy/muddy substrates while spiny scallops prefer sandy/rocky substrates. Pink and spiny scallops spawn in the fall and summer respectively. Larvae are planktonic for four to five months. Both species have the ability to free swim but will set and remain in an area. Rock scallops are found at Termination Pt. Pink and spiny scallops (not mapped) are found near Termination Pt. and in Dabob Bay.

Seasonal Sensitivity: Summer and fall due to reproductive cycle.

Recommended Protection Strategy: Utilize beach clean up techniques that do not transport oil into shallow subtidal area.

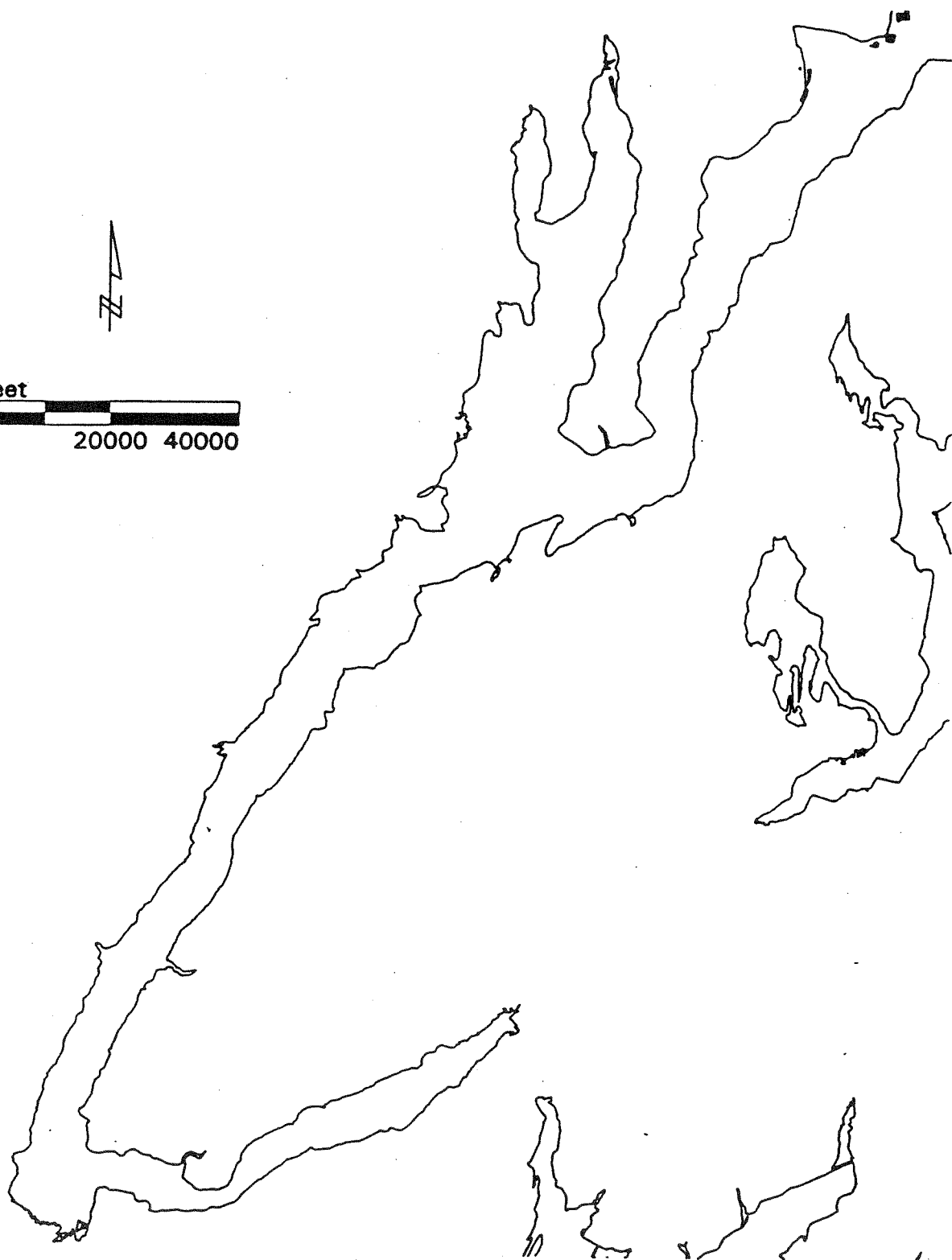
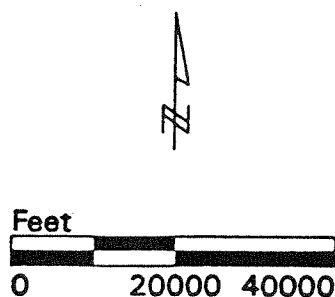
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References:

Siezemore, B. WDF Shellfish Program, personal communication.

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Hood Canal Shellfish Resources



Pink and Spiny Scallops

Rock Scallop

USGS Shoreline

Source: Washington Department of Fisheries
This map does not offer complete information on fish and shellfish resource distribution. Comprehensive surveys have not been conducted along all shorelines.

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**Hood Canal Geographic Response Plan Workshop
Data Recording Sheet**

Resource: Octopus (*Octopus dofleini*)

Resource Information Mapped: No map provided.

Resource Use: Harvested in commercial, recreational, and subsistence fisheries.

General Location or Habitat Association of Resource: Octopus live in caves or dens from the lower intertidal to the subtidal zones. Octopus are found throughout Hood Canal.

Seasonal Sensitivity: The portion of the population inhabiting the lower intertidal and shallow subtidal zone would be subject to exposure during extreme low tides throughout the year. Octopus are also susceptible to exposure via contaminated prey, particularly clams and crab.

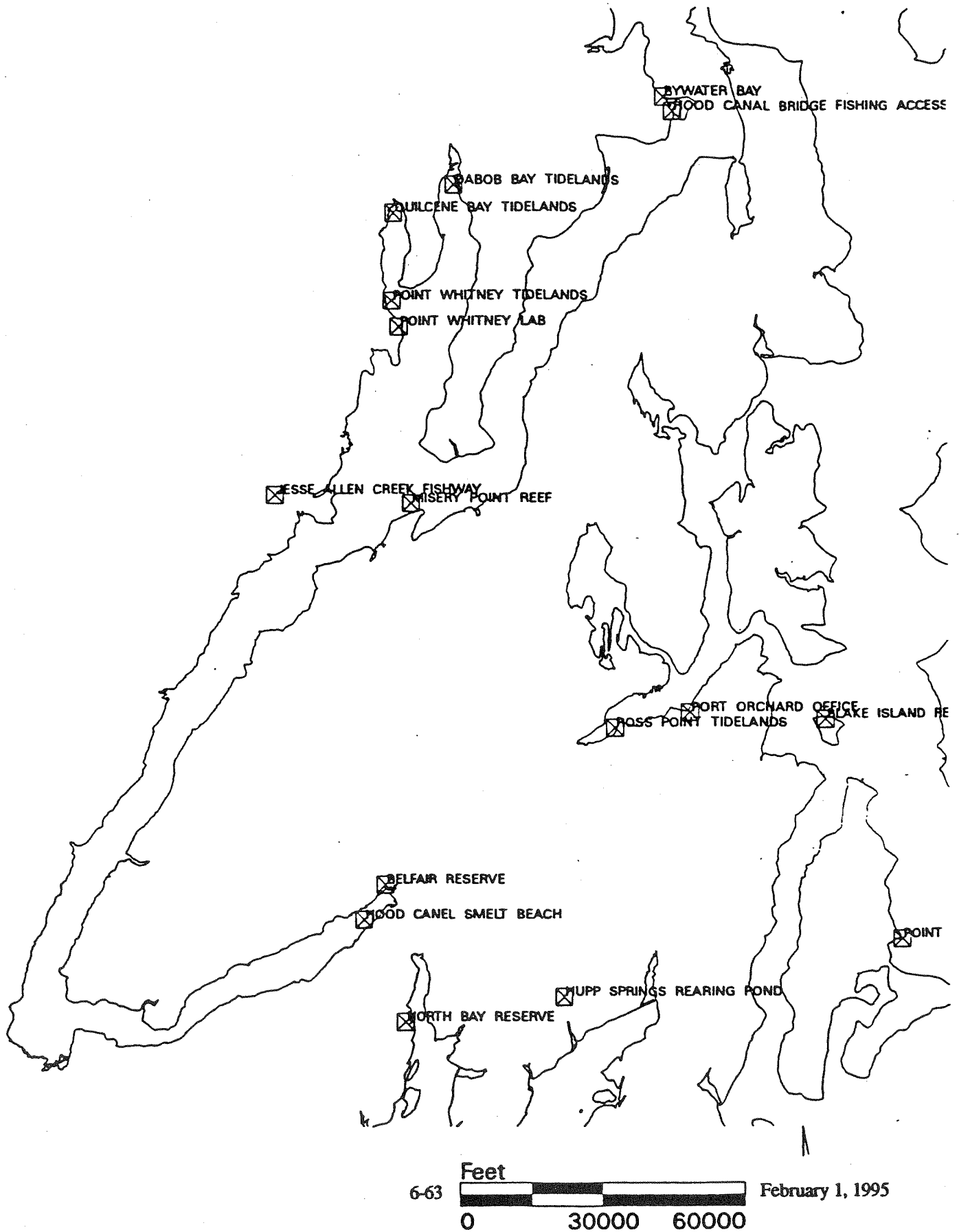
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WDF Hood Canal Facilities



Hood Canal Salmon/Steelhead Populations

I. Salmonid Stocks present in the Canal.

<u>Stock</u>	<u>Origin</u>	<u>Production Type</u>	<u>Status</u>
Hood Canal Summer/Fall Chinook	Mixed	Composite	Healthy
Escapement is generally strong in the Skokomish system but very weak in the Dosewallips, Duckabush, Hamma Hamma, Dewatto, Tahuya & Union systems.			
Hood Canal Summer Chum	Native	Wild	Critical
Very low escapements into tributaries such as the Quilcene, Dosewallips, Duckabush, Hamma Hamma, Dewatto & Tahuya Rivers.			
Union R. Summer Chum	Native	Wild	Healthy
NE Hood Canal Fall Chum	Mixed	Composite	Healthy
Found primarily in Anderson, Big Beef, Seabeck & Stavis Creeks.			
Dewatto R. Fall Chum	Mixed	Composite	Healthy
SE Hood Canal Fall Chum	Mixed	Composite	Healthy
Found in lower Hood Canal streams including Stimson, Big and Little Mission, Twanoh, Alderbrook, Rendsland, and Caldervin Creeks; also the Union and Tahuya Rivers.			
Lower Skokomish R. Fall Chum	Mixed	Composite	Unknown
Upper Skokomish R. Late Fall Chum	Native	Wild	Healthy
West Hood Canal Fall Chum	Mixed	Composite	Healthy
Found in most accessible smaller west-side tributaries from the Hoodsport area north to about the vicinity of Fulton Creek.			
Hamma Hamma R. Late Fall Chum	Native	Wild	Healthy
Duckabush R. Late Fall Chum	Native	Wild	Healthy
Dosewallips R. Late Fall Chum	Native	Wild	Healthy
Quilcene Late Fall Chum	Mixed	Composite	Healthy
Spawning occurs in the Big and Little Quilcene Rivers, Marple and Spencer Creeks, and Wolcott Slough.			

NE Hood Canal Coho Mixed Wild Depressed
Found in all accessible east-side tributaries from Port Gamble to Anderson Creek and in Thorndyke & Shine creeks on the western shoreline.

Dewatto R. Coho Mixed Wild Depressed

SE Hood Canal Coho Mixed Wild Depressed
Found in the Tahuya, Mission and Union drainages and in other small streams in this area.

Skokomish R. Coho Mixed Composite Healthy

SW Hood Canal Coho Mixed Wild Healthy
Found in independent drainages from the Skokomish to the Hamma Hamma R.

Hamma Hamma Coho Mixed Wild Healthy

Duckabush R. Coho Mixed Wild Depressed

Dosewallips R. Coho Mixed Wild Healthy

Quilcene/Dabob Bay Coho Mixed Composite Depressed
Spawning occurs in all accessible tributaries to Quilcene & Dabob Bays.

Hamma Hamma Pink Native Wild Healthy

Duckabush Pink Native Wild Healthy

Dosewallips Pink Native Wild Depressed

Skokomish Summer Steelhead Unresolved Unresolved Unknown

Duckabush Summer Steelhead Unresolved Unresolved Unknown

Dosewallips Summer Steelhead Unresolved Unresolved Unknown

Dewatto R. Winter SH Unresolved Unresolved Depressed

Tahuya R. Winter SH Unresolved Unresolved Depressed

Union R. Winter SH Unresolved Unresolved Unknown

Skokomish Winter SH Unresolved Unresolved Depressed

Hamma Hamma Winter SH Native Wild Unknown

Duckabush Winter SH Unresolved Unresolved Depressed

Dosewallips Winter SH Unresolved Unresolved Depressed

Quilcene/Dabob Bay

Winter Steelhead Unresolved Unresolved Unknown

Spawn in tributaries to Quilcene and Dabob Bays, including the Big and Little Quilcene Rivers and Tarboo Creek.

Summary - Present status of Hood Canal Salmon/Steelhead Stocks:

	<u>Total No. of stocks</u>	<u>Total critical/ depressed status</u>
Summer/Fall Chinook	1	0
Summer Chum	2	1
Fall Chum	10	0 (1 unknown status)
Coho	9	5
Pink	3	1
Summer Steelhead	3	0 (all unknown status)
Winter Steelhead	8	5 (3 unknown status)
Total:	36	12 (but 7 unknown status also)

II. Hood Canal Salmon/Steelhead Streams.

A. Hood Canal Basin, WRIA 16, streams originating on the Olympic Peninsula and entering Hood Canal on its western shoreline.

<u>Stream</u>	<u>WRIA No.</u>	<u>Cat. Page No.</u>	<u>Salmonid populations & recent juvenile plants</u>
Skokomish R.	16.0001	102	Hood Canal summer/fall chinook Lower Skokomish fall chum Upper Skokomish late fall chum Skokomish coho Skokomish summer steelhead Skokomish winter steelhead Hatchery plants: fall chinook, chum, coho
Enetai Cr.	16.0217	102	Hatchery plants: fall chinook & chum
Hoodsport Area independent tributaries.			
Hill Creek	16.0221	502	West Hood Canal fall chum Southwest Hood Canal coho
Finch Creek	16.0222	502	Hatchery plants: spring & fall chinook, chum, pinks & coho.
Clark Creek	16.0224	502	West Hood Canal fall chum Southwest Hood Canal coho
Miller Creek	16.0225	502	West Hood Canal fall chum Southwest Hood Canal coho
Sund Creek	16.0226	502	West Hood Canal fall chum Southwest Hood Canal coho Hatchery plants: fall chinook
Little Lilliwaup Cr.	16.0228	502	West Hood Canal fall chum Southwest Hood Canal coho
Lilliwaup Cr.	16.0230	502	West Hood Canal fall chum Southwest Hood Canal coho Hatchery plants: fall chinook & chum
Eagle Creek	16.0243	502	West Hood Canal fall chum Southwest Hood Canal coho Hatchery plants: fall chinook & chum
Jorsted Cr.	16.0248	502	West Hood Canal fall chum Southwest Hood Canal coho

Hamma Hamma River	16.0251	602	Hood Canal summer/fall chinook Hood Canal summer chum Hamma Hamma late chum Hamma Hamma coho Hamma Hamma pinks Hamma Hamma winter steelhead Hatchery plants: fall chinook & chum
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Eldon area independent tributaries.

Waketick Creek	16.0318	702	Chum, coho (?-shown in Stream Catalog but no recent WDF surveys)
Schaerer Creek	16.0326	702	Chum, coho (?-shown in Stream Catalog but no recent WDF surveys)
Fulton Cr.	16.0332	702	West Hood Canal fall chum Duckabush coho Hatchery plants: chum
McDonald Cr.	16.0349	702	Chum, coho (?-shown in Stream Catalog but no recent WDF surveys)

Duckabush River	16.0351	802	Hood Canal summer/fall chinook Hood Canal summer chum Duckabush late chum Duckabush coho Duckabush pinks Duckabush summer steelhead Duckabush winter steelhead Hatchery plants: fall chinook & chum
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Dosewallips River	16.0442	1002	Hood Canal summer/fall chinook Hood Canal summer chum Dosewallips late chum Dosewallips coho Dosewallips pinks Dosewallips summer steelhead Dosewallips winter steelhead Hatchery plants: fall chinook
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Walcott Slough	16.0558	1002	Quilcene late fall chum (Quilcene Hatchery planting location)
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B. Quilcene and Dabob Bay tributaries, Quilcene Basin, WRIA 17

Marple Cr.	17.0001	102	Quilcene late fall chum Quilcene/Dabob coho
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Spencer Cr.	17.0004	102	Quilcene late fall chum Quilcene/Dabob coho
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Big Quilcene River	17.0012	102	Quilcene late fall chum Quilcene/Dabob coho Quilcene/Dabob winter steelhead Hatchery plants: spring chinook, chum, coho
Little Quilcene R.	17.0076	202	Quilcene late fall chum Quilcene/Dabob coho Quilcene/Dabob winter steelhead Hatchery plants: coho
Donovan Cr.	17.0115	202	Quilcene/Dabob coho
Tarboo Cr.	17.0129	302	Quilcene late fall chum Quilcene/Dabob coho Quilcene/Dabob winter steelhead Hatchery plants: fall chinook, chum, coho
Thorndyke Creek	17.0170	302	Quilcene late fall chum Northeast Hood Canal coho Hatchery plants: chum
Shine Cr.	17.0181	302	Northeast Hood Canal coho

C. Streams draining the west side of the northern Kitsap Peninsula and flowing into the east side of Hood Canal, Kitsap Basin, WRIA 15.

Port Gamble - Seabeck independent drainages

Gamble Cr.	15.0356	802	Northeast Hood Canal coho
Little Anderson Cr.	15.0377	802	Northeast Hood Canal coho Northeast Hood Canal fall chum
Big Beef Cr.	15.0389	902	Northeast Hood Canal fall chum Northeast Hood Canal coho Hatchery plants: fall chinook
Little Beef Creek	15.0399	902	Northeast Hood Canal fall chum Northeast Hood Canal coho
Seabeck Cr.	15.0400	902	Northeast Hood Canal fall chum Northeast Hood Canal coho
Stavis Cr.	15.0404	902	Northeast Hood Canal fall chum Northeast Hood Canal coho
Boyce Cr.	15.0407	902	Northeast Hood Canal coho
Unnamed	15.0408	902	Northeast Hood Canal fall chum Northeast Hood Canal coho

Anderson Cr.	15.0412	1002	Northeast Hood Canal fall chum Northeast Hood Canal coho Hatchery plants: chum
Dewatto R.	15.0420	1002	Hood Canal summer/fall chinook Hood Canal summer chum Dewatto River fall chum Dewatto coho Dewatto winter steelhead Hatchery plants: fall chinook
Ayres Point independent drainages			
Rendsland Cr.	15.0439	1102	Southeast Hood Canal fall chum Southeast Hood Canal coho
Caldervin Cr.	15.0445	1102	Southeast Hood Canal fall chum Hatchery plants: chum
Tahuya River	15.0046	1202	Hood Canal summer/fall chinook Hood Canal summer chum Southeast Hood Canal fall chum Southeast Hood Canal coho Tahuya winter steelhead Hatchery plants: fall chinook & chum
Shoofly Cr.	15.0478	1202	Southeast Hood Canal fall chum
Stimson Cr.	15.0488	1202	Southeast Hood Canal fall chum Southeast Hood Canal coho Hatchery plants: chum
Little Mission Cr.	15.0493	1302	Southeast Hood Canal fall chum Southeast Hood Canal coho
Big Mission Creek	15.0495	1302	Southeast Hood Canal fall chum Southeast Hood Canal coho
Union River	15.0503	1302	Hood Canal summer/fall chinook Union River summer chum Southeast Hood Canal fall chum Southeast Hood Canal coho Union River winter steelhead Hatchery plants: fall chinook & chum

D. Hood Canal Tributaries South of Union River, Shelton Basin, WRIA 14.

Twanoh Cr.	14.0134	602	Southeast Hood Canal fall chum Hatchery plants: chum
Alderbrook Creek	14.0138	602	Southeast Hood Canal fall chum

III. Net pen locations in Hood Canal

Hood Canal Net Pens - Sund Rocks, west side of Canal, just north of Hoodsport. 200,000 fall chinook.

Glen Ayr Pen - Glen Ayr Trailer Park N. of Hoodsport. 6,500 fall chinook.

Hoodsport Marina. 5,000 fall chinook.

Hood Canal Marina @ Union. 25,000 fall chinook.

Port Gamble Coop (Tribal facility), two locations - one on the SW side of Quilcene Bay, about 1000 ft N of Fisherman's Point, and one about 2000 ft S of Pt. Julia in Port Gamble Bay. 760,000 coho combined production.

Pleasant Harbor Marina. 15,000 fall chinook.

Puget Sound Fish and Shellfish Habitat Association Table - Key

Life Stages -
eggs
larvae
juveniles
spawners/spawning
parturition (birth)
adults

Timing -
--- common
+++ abundant
*** highly abundant

6-72 Salinity Range -
tidal fresh 0.0 - 0.5 ppt
mixing 0.5 - 25.0 ppt
seawater >25.0 ppt

Habitats -
intertidal 0-3 m
subtidal 3-10m

Data Source -
Monaco, M.E. et al. 1990. Distribution and abundance of fishes and invertebrates in west coast estuaries. Vol. I: Data summaries. ELMR Rept. 4. Strategic Assessment Branch, NOS/NOAA, Rockville, MD
Emmett, R.L. et al. 1991. Distribution and abundance of fishes and invertebrates in west coast estuaries. Vol. II: Species Life History Summaries. ELMR Rept. 8. Strategic Assessment Branch, NOS/NOAA, Rockville, MD

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Fish Habitat Association in Puget Sound

Species	Timing	Salinity Range			Substrate Preference										Habitats							
															Type			Area				
		Tidal	Fresh		Mixing	Seawater	Mud / Silt / Clay	Sand / Granule	Pebble	Cobble	Boulder / Riprap	Rocky Outcrop	Estuarine Veg	Marine Veg	None	Benthic Intertidal	Benthic Subtidal	Pelagic	Mainstem Channel	Subsidiary Channel	Channel Edge	Intertidal Flat
Spring Chinook Salmon	J F M A M J J A S O N D																					
	Juveniles	-----	X	X	X		X	X	X									X	X	X	X	X
	adults	-----	X	X	X		X	X	X									X	X	X	X	X
Fall Chinook Salmon	J F M A M J J A S O N D																					
	Juveniles	-----	X	X	X		X	X	X									X	X	X	X	X
	adults	-----	X	X	X		X	X	X									X	X	X	X	X
Sockeye Salmon	J F M A M J J A S O N D																					
	Juveniles	-----	X	X	X									X				X	X	X	X	X
	adults	-----	X	X	X		X	X										X	X	X	X	X
Coho Salmon	J F M A M J J A S O N D																					
	Juveniles	-----	X	X	X		X	X										X	X	X	X	X
	adults	-----	X	X	X		X	X										X	X	X	X	X
Chum Salmon	J F M A M J J A S O N D																					
	Juveniles	-----	X	X	X									X				X	X	X	X	X
	adults	-----	X	X	X		X	X										X	X	X	X	X

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Fish Habitat Association in Puget Sound (cont.)

Species	Timing	Salinity Range			Substrate Preference										Habitats					
															Type		Area			
		Tidal	Fresh	Seawater	Mud/Silt/Clay	Sand/Granule	Pebble	Cobble	Boulder/Riprap	Rocky Outcrop	Estuarine Veg	Marine Veg	None	Benthic Intertidal	Benthic Subtidal	Pelagic	Mainstem Channel	Subsidiary Channel	Channel Edge	Intertidal Flat
Pink Salmon		J F M A M J J A S O N D																		
	Juveniles	+++++-----	X	X	X								X			X	X	X	X	X
	adults	-----+	X	X	X		X	X								X	X	X	X	X
Surf Smelt		J F M A M J J A S O N D																		
	eggs	*****		X	X	X								X						
	larvae	++++++		X	X	X								X						
	Juveniles	++++++		X	X								X			X	X	X	X	X
	spawners	*****		X	X	X								X						
	adults	++++++		X	X								X			X	X	X	X	X
Herring		J F M A M J J A S O N D																		
	eggs	*****		X	X						X	X		X	X					X
	larvae	*****		X	X								X			X	X	X	X	X
	Juveniles	++++++		X	X								X			X	X	X	X	X
	spawners	*****		X	X						X	X		X	X					X
	adults	++++++		X	X								X			X	X	X	X	

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Fish Habitat Association in Puget Sound (cont)

Species	Timing	Salinity Range			Substrate Preference										Habitats						
															Type			Area			
		Tidal Fresh	Mixing	Seawater	Mud / Silt / Clay	Sand / Granule	Pebble	Cobble	Boulder / Riprap	Rocky Outcrop	Estuarine Veu	Marine Veu	None	Benthic Intertidal	Benthic Subtidal	Pelagic	Mainstem Channel	Subsidiary Channel	Channel Edge	Intertidal Flat	
Longfin Smelt		J F M A M J J A S O N D																			
	eggs					X											X				
	larvae	-----	X	X	X		X									X	X	X	X		
	juveniles	-----		X	X								X			X	X	X	X		
	adults	-----	X	X	X								X			X	X	X	X		
Anchovy		J F M A M J J A S O N D																			
	eggs	--		X	X								X			X					
	larvae	----		X	X								X			X	X	X	X		
	juveniles	-----		X	X								X			X	X	X	X		
	spawners	----		X	X								X			X					
	adults	-----		X	X								X			X	X	X	X		
Sand Lance		J F M A M J J A S O N D																			
	eggs	*****++		X	X		X							X	X	X	X				
	larvae	++++*****++		X	X		X									X	X				
	juveniles	++++*****+++++		X	X		X							X	X	X	X				
	spawners	*****++		X	X		X							X	X	X	X				
	adults	-----		X	X		X							X	X	X	X				

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ADIRALTY INLET GRP

Fish Habitat Association in Puget Sound (cont.)

Species	Timing	Salinity Range			Substrate Preference										Habitats					
															Type			Area		
		Tidal Fresh	Mixing	Seawater	Mud/ Silt/ Clay	Sand/ Granule	Pebble	Cobble	Boulder/ Riprap	Rocky Outcrop	Estuarine Veu	Marine Veu	None	Benthic Intertidal	Benthic Subtidal	Pelagic	Mainstem Channel	Subsidiary Channel	Channel Edge	Intertidal Flat
English Sole	J F M A M J J A S O N D																			
	eggs	*****			X									X						
	larvae	++++++		X	X	X							X			X	X	X		
	Juveniles	*****		X	X	X	X					X	X		X	X		X	X	X
	spawning	++++++		X	X	X	X							X						
	adults	++++++		X	X	X	X					X	X		X		X			
Starry Flounder	J F M A M J J A S O N D													X		X				
	eggs	-----			X									X			X			
	larvae	-----		X	X									X		X	X			
	Juveniles	-----	X	X	X	X	X					X	X		X	X		X	X	X
	spawning	-----			X		X													
	adults	++++++		X	X	X	X					X	X		X	X		X	X	
Ling Cod	J F M A M J J A S O N D														X	X				
	eggs	-----			X					X	X				X	X				
	larvae	-----		X	X								X			X				
	Juveniles	-----		X	X	X	X			X	X	X	X		X	X		X	X	X
	spawning	-----			X					X	X				X	X				
	adults	-----			X					X	X		X		X	X				

Fish Habitat Association in Puget Sound (cont.)

Species	Timing	Salinity Range			Substrate Preference										Habitats						
															Type			Area			
		Tidal	Fresh	Mixing	Seawater	Mud/Silt/Clay	Sand/Granule	Pebble	Cobble	Boulder/Ripp	Rocky Outcrop	Estuarine Veg	Marine Veg	None	Benthic Intertidal	Benthic Subtidal	Pelagic	Mainstem Channel	Subsidiary Channel	Channel Edge	Intertidal Flat
Shiner Perch	J F H A M J J A S O N D																				
Juveniles	+++++*****	X		X	X	X	X						X		X		X	X	X	X	X
parturition	---++++--			X		X	X						X		X				X	X	X
adults	*****			X	X	X	X						X		X		X	X	X	X	X
Perch	J F H A M J J A S O N D																				
Juveniles	++*****+	X		X	X	X	X						X					X	X	X	X
parturition	---++++--			X	X	X	X						X						X	X	X
adults	---++++++--			X	X	X	X						X					X	X	X	X
Pacific Tomcod	J F H A M J J A S O N D																				
larvae	-----			X	X									X				X	X	X	
Juveniles	-----+*****			X	X	X	X						X	X			X		X	X	X
adults	*****			X	X	X	X										X		X	X	X

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Shellfish Habitat Association in Puget Sound (cont.)

Species	Timing	Salinity Range			Substrate Preference								Habitats						
													Type			Area			
		Tidal	Fresh										Benthic Intertidal	Benthic Subtidal	Pelagic	Mainstem Channel	Subsidiary Channel	Channel Edge	Intertidal Flat
Pacific Gaper Clam	J F M A M J J A S O N D																		
eggs	+++++			X	X							X			X	X	X	X	X
larvae	+++++			X	X							X			X	X	X	X	X
juvenile	+++++			X	X	X	X						X	X		X	X	X	X
spawning	+++++			X	X								X	X		X	X	X	X
adults	+++++			X	X	X	X						X	X		X	X	X	X
Horse Clam	J F M A M J J A S O N D																		
eggs	-----											X			X	X	X	X	X
larvae	-----			X	X							X			X	X	X	X	X
juvenile	+++++			X	X	X	X						X	X		X	X	X	X
spawning	-----												X	X		X	X	X	X
adults	+++++			X	X	X	X						X	X		X	X	X	X
Little Neck Clam	J F M A M J J A S O N D																		
eggs	*****											X			X	X	X	X	X
larvae	*****											X			X	X	X	X	X
juveniles	*****			X	X	X	X	X	X				X	X		X	X	X	X
spawning	*****											X	X	X		X	X	X	X
adults	*****			X	X	X	X	X	X				X	X		X	X	X	X

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Shellfish Habitat Association in Puget Sound

Shellfish Habitat Association in Puget Sound																				
Species	Timing	Salinity Range			Substrate Preference								Habitats							
													Type			Area				
		Tidal Fresh	Mixing	Seawater	Mud/Silt/Clay	Sand/Granule	Pebble	Cobble	Boulder/Riprap	Rocky Outcrop	Estuarine veg	Marine veg	None	Benthic Intertidal	Benthic Subtidal	Pelagic	Mainstem Channel	Subsidiary Channel	Channel Edge	Intertidal Flat
Dungeness Crab	J F M A M J J A S O N D																			
eggs	-----												X			X	X	X		
larvae	-----		X	X											X	X	X			
Juveniles	-----+*****		X	X	X	X	X				X			X	X		X	X	X	X
mating	-----												X	X						
adults	*****		X	X	X	X	X						X	X		X	X	X		
Blue Mussel	J F M A M J J A S O N D												X			X	X	X	X	X
eggs	*****		X	X									X			X	X	X	X	X
larvae	*****		X	X									X			X	X	X	X	X
Juveniles	*****		X	X				X	X	X				X	X		X	X	X	X
spawning	*****		X	X									X	X	X		X	X	X	X
adults	*****		X	X				X	X	X				X	X		X	X	X	X
Softshell Clam	J F M A M J J A S O N D												X			X	X	X	X	X
eggs	*****		X	X									X			X	X	X	X	X
larvae	*****		X	X												X	X	X	X	X
Juvenile	*****		X	X	X	X								X	X		X	X	X	X
spawning	*****		X	X									X	X	X		X	X	X	X
adults	*****		X	X	X	X								X	X		X	X	X	X

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Shellfish Habitat Association in Puget Sound (cont.)

Species	Timing	Salinity Range			Substrate Preference										Habitats					
															Type			Area		
		Tidal Fresh	Mixing	Seawater	Mud/ Silt/ Clay	Sand/ Granule	Pebble	Cobble	Boulder/ Rippap	Rocky Outcrop	Estuarine veg	Marine veg	None	Benthic Intertidal	Benthic Subtidal	Pelagic	Mainstem Channel	Subsidiary Channel	Channel Edge	Intertidal Flat
Manila Clam	J F M A M J J A S O N D																			
	eggs	*****											X			X	X	X	X	X
	larvae	*****		X	X								X		X	X	X	X	X	X
	juveniles	*****		X	X	X	X	X	X					X	X				X	X
	spawning	*****											X	X	X				X	X
	adults	*****		X	X	X	X	X	X					X	X				X	X
Pacific Oyster	J F M A M J J A S O N D												X			X	X	X	X	X
	eggs												X			X	X	X	X	X
	larvae												X			X	X	X	X	X
	juveniles	*****		X	X	X	X	X	X	X				X	X		X	X	X	X
	adults	*****		X	X	X	X	X	X	X				X	X		X	X	X	X
Geoduck Clam	J F M A M J J A S O N D												X			X	X	X	X	X
	eggs	+++++		X	X								X			X	X	X	X	X
	larvae	+++++		X	X											X	X	X	X	X
	juveniles	+++++		X	X	X	X							X	X		X	X	X	X
	spawning	+++++		X	X								X	X	X		X	X	X	X
	adults	+++++		X	X	X	X							X	X		X	X	X	X

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